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EXAMINER

HARPER, V PAUL

ART UNIT

PAPER NUMBER

2654

DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/599,563

Applicant(s)

EJERHED ET AL.

Examiner

V. Paul Harper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The Examiner has considered the references listed in the Information Disclosure Statements dated 10/24/00 and 2/27/01. A copy of the Information Disclosure Statement is attached to this office action.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 13, 16, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Julliard (European Patent Application EP 0 886 226 A1), hereinafter referred to as Julliard.

Regarding claim 1, Julliard discloses a linguistic search system and includes the following methods: analyzing a text database to determine whether there is a match between a query and a portion of said text database where the match is done on a tagged form of the database (col. 1, lines 40-44, col. 5, lines 7-57), which corresponds to “analyzing said natural language text corpus with respect to surface structure for word tokens and surface syntactic roles of constituents”; indexing the text corpus (col. 5, lines 7-44), which corresponds to “indexing and storing the analyzed natural language

text corpus”; analyzing the natural language query (col. 1, lines 31-40), which corresponds to “analyzing a natural language query with respect to surface structure of word tokens and surface syntactic roles of constituents”; converting the natural language expression to a tagged form including one or more words and for each word a part-of-speech tag (col. 1, lines 35-40), which corresponds to “creating one or more surface variants of the analyzed natural language query, said one or more surface variants being equivalent to said natural language query with respect to lexical meaning of word tokens and surface syntactic roles of constituents”; analyzing the text database to determine whether there is a match (col. 1, lines 41-45, col. 5, lines 7-58), which corresponds to “comparing said one or more surface variants and said analyzed natural language query with the indexed and stored analyzed natural language text corpus”; and determining the location of a match with said regular expression or index (col. 1, line 57 through col. 2, line 1, Fig. 1. **s6**, col. 5, lines 6-44), which corresponds to “extracting from said indexed and stored analyzed natural language text corpus, each portion of text comprising a string of word tokens that matches any one of said surface variants or said analyzed natural language query.”

Regarding claim 2, Julliard teaches everything claimed, as applied above (see claim 1); in addition, Julliard teaches the use of a part-of-speech tagger to determine a simplified part-of speech of each word (e.g., NOUN, VERB, ADJ) and the generation of rules based on a grammar (col. 3, lines 39-55, col. 4, lines 8-55, Fig. 2 **50 51 52**), which corresponds to “in the step of creating, said surface syntactic roles of constituents are head and modifier roles, and grammatical relations.”

Regarding claim 3, Julliard teaches everything claimed, as applied above (see claim 1); in addition, Julliard teaches that a regular expression, including word tokens tagged for part-of-speech, is matched against the corpus using an indexing scheme to pinpoint text (Fig. 2 s4 52 s5 s6, col. 5, lines 7-58), which corresponds to “in the step of extracting, a string of word tokens in said indexed and stored analyzed natural language text corpus matches one of said surface variants or said analyzed natural language query if it comprises the head words of phrases bearing the grammatical relations of subject, object, and lexical main verb in said one of said surface variants or said analyzed natural language query in the same linear order as in said one of said surface variants or said analyzed natural language query.”

Regarding claim 4, Julliard teaches everything claimed, as applied above (see claim 1). In addition, Julliard teaches that the text corpus and the query are both tagged (col. 1, lines 45-56, col. 5, lines 6-25, note (1)), which corresponds to “in the step of analyzing a natural language query, said natural language query is analyzed in the same manner as said natural language text corpus is analyzed in the step of analyzing said natural, language text corpus.”

Regarding claim 5, Julliard teaches everything claimed, as applied above (see claim 1). In addition, Julliard teaches the following: generating a part-of-speech tag that includes a morphological feature marker where both the query and the text under go part-of-speech tagging (col. 1, lines 45-53, col. 5, note (1)), which corresponds to “determining a morpho-syntactic description for each word token of said natural language text corpus; and determining a morpho-syntactic description for each word

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token of said natural language query”; generating regular expression representations that can represent phrases and locating the regular expressions within the database where a regular expression inherently determines the type of the phrase (col. 1, line 45, col. 2, line 1, col. 5, lines 6-19), which corresponds to “locating phrases in said natural language text corpus; determining a phrase type for each of said phrases”; locating the position of sentences within the database (col. 5, lines 37-39), which corresponds to “locating clauses in said natural language text corpus.” In addition, during the analysis of the query, Julliard teaches the application of grammar rules to one or more words (i.e., word, phrase or clause) deriving a regular expression representation where the regular expression inherently determines the type of the phrase (or clause) (col. 1, lines 38-41), which corresponds to “locating phrases in said natural language query; determining a phrase type for each of said phrases; and locating clauses in said natural language query.”

Regarding claim 13, Julliard teaches everything claimed, as applied above (see claim 1). In addition, Julliard teaches that a regular expression is matched with the corpus (Fig. 2 s5) or an indexing mechanism is used to locate a sentence or file (document) and that the matched expression (or indexed entity) is pinpointed in the original text (Fig. 2 s6), which corresponds to “in the step of extracting, a portion of text that is extracted is either the matching string of word tokens, a clause comprising the matching string of word tokens, a sentence comprising the matching string of word tokens, a paragraph comprising the matching string of word tokens, or a document comprising the matching string of word tokens.”

Regarding claim 16, Julliard teaches a system for linguistic search with the following features: a part-of-speech tagger that analyzes both the text corpus and the query (col. 1, lines 45-55, col. 5, line 6-18), which corresponds to "a text analysis unit for analyzing a natural language text corpus and a natural language query with respect to surface structure of word tokens and surface syntactic roles of constituents"; storage means for storing the tagged text corpus (Fig. 1 38), which corresponds to "storage means operatively connected to said text analysis unit, for storing the analyzed natural language text corpus"; an indexer inherently connected to the storage means (Fig. 1, col. 5, lines 19-44), which corresponds to "an indexer, operatively connected to said storage means, for indexing the analyzed natural language text corpus; an index, operatively connected to said indexer, for storing said indexed analyzed natural language text corpus"; the ability to process the query that includes tagging (Fig. 2, s1 s2 s3 s4, col. 1, lines 45-56, Fig. 1), which corresponds to "a query manager, operatively connected to said text analysis unit, comprising means for creating surface variants of said natural language query, said surface variants being equivalent to said natural language query with respect to lexical meaning of word tokens and surface syntactic roles of constituents"; the ability to match the analyzed query to the text database (col. 1, line 56 through col. 2, line 1, Fig. 2 s5, col. 5, lines 6-43), which corresponds to "and means for comparing said surface variants and said analyzed natural language query with the indexed analyzed natural language text corpus in said index"; the ability to pinpoint the matched expression in the original text (Fig. 2, s6, col. 2, lines 31-44), which corresponds to "a result manager operatively connected to said

index, for extracting, from said indexed and stored analyzed natural language text corpus, each portion of text comprising a string of word tokens that matches any one of said surface variants or said analyzed natural language query.”

Regarding claims 19 and 20, Julliard teaches everything claimed, as applied above (see claim 1); in addition, Julliard teaches that the steps, operations or manipulations described can be implemented by means of a software controlled processor with machine readable code (col. 3, lines 21-26), which corresponds to “(claim 19) [a] computer readable medium having computer-executable instructions for a general-purpose computer to perform the steps recited in claim 1; and (claim 20) [a] computer program comprising computer-executable instructions for performing the steps recited in claim 1.”

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 6-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julliard in view of Arampatzis et al. (“An Evaluation of Linguistically-motivated Indexing Schemes,” Technical Report CSI-R9918, University of Nijmegen, Sept 1999), hereinafter referred to as Arampatzis-Indexing.



Regarding claim 6, Julliard teaches everything claimed, as applied above (see claim 5); in addition, Julliard teaches the use of an indexing mechanism applied to the tagged text corpus, but Julliard does not specifically teach the “[ (a) ] providing, for each word token of said natural language text corpus with, a unique word token location identifier; [ (b) ] storing information regarding the location of each word token of said natural language text corpus, based on said unique word token location identifiers; [ (c) ] storing, for each phrase type, information regarding the location of each phrase of this type in said natural language text corpus, based on said unique word token location identifiers; and [ (d) ] storing information regarding the location of each clause in said natural language text corpus, based on said unique word token location identifiers”; However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Indexing.

Arampatzis-Indexing teaches linguistically-motivated indexing schemes based on part-of-speech tagging and shallow parsing (abstract) where Arampatzis-Indexing’s representational choices include **w** ((a) (b), above), **Lnj**, **Lnv** ((c) (d), above) (an indexing for all word-forms, lemmatized nouns and adjectives (phrases), and nouns and verbs (clauses) found in the text. (§3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard by specifically providing a unique word token location identifier, as taught by Arampatzis-Indexing, for the purpose of having access to a variety of individual representational choices.

Regarding claim 7, Julliard in view of Arampatzis-Indexing teach everything claimed, as applied above (see claim 6); in addition, Julliard teaches that the part-of-speech tagger is applied to the corpus (i.e., the type of each word is included in the tagged corpus) (col. 1, note (1)), which corresponds to “storing each word type of said natural language text corpus.” But Julliard in view of Arampatzis-Indexing do not specifically teach “storing, for each word token, its unique word token location identifier logically linked to the stored associated word type.” However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Indexing.

Arampatzis-Indexing further teaches the use of a word representation indexing set *w* to index all words in the corpus (§’s 2, 3, and 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard in view of Arampatzis-Indexing by specifically providing word token location indexing, as taught by Arampatzis-Indexing, for the purpose of accessing all the words in a corpus.

Regarding claim 8, Julliard in view of Arampatzis-Indexing teach everything claimed, as applied above (see claim 7). But Julliard in view of Arampatzis-Indexing do not specifically teach that the location of phrases comprises the step of “[(a)] providing, for each phrase of said natural language text corpus, a unique phrase location identifier identifying the word tokens spanned by the phrase; [(b)] storing each phrase type of said natural language text corpus; and [(c)] storing, for each phrase, its unique phrase location identifier logically linked to the stored associated phrase type.” However, the

examiner contends that these step were well known in the art, as taught by Arampatzis-Indexing.

Arampatzis-Indexing further teach the use of indexes (location identifiers) associated with **Lnj** (lemmatized nouns and adjectives) and **Lnjv** (lemmatized nouns, adjectives and verbs) (§'s 2, 3, and 4), which corresponds to (a), above; creating phrase frames that are associated with each semantically distinct phrase (i.e., type of phrase) (Fig. 1, §2), which corresponds to (b), above; where each phrase has an index and a phrase frame (location and type) (§'s 2, 3), which corresponds to (c), above.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard in view of Arampatzis-Indexing by specifically providing steps indicated above, as taught by Arampatzis-Indexing, for the purpose of supporting an approach consistent with the Phrase Retrieval Hypothesis (§2, ¶1).

Regarding claim 9, Julliard in view of Arampatzis-Indexing teach everything claimed, as applied above (see claim 7). But Julliard in view of Arampatzis-Indexing do not specifically teach that the location of phrases comprises the step of "[a)] providing, for each clause of said natural language text corpus, a unique clause location identifier; [(b)] identifying the word tokens and phrases spanned by the clause; [(c)] storing, for each clause, its unique clause location identifier." However, the examiner contends that these steps were well known in the art, as taught by Arampatzis-Indexing.

Arampatzis-Indexing further teach the use of indexes (location identifiers) associated with **Lnjv** (lemmatized nouns, adjectives and verbs) (§'s 2, 3, and 4), which

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corresponds to (a), above; creating phrase frames that are associated with each semantically distinct phrase (where the phrases can include nouns and verbs, i.e., clauses) (Fig. 1, §2), which corresponds to (b), above; where each phrase has an index and a phrase frame (location and type) (§'s 2, 3), which corresponds to (c), above.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard in view of Arampatzis-Indexing by specifically providing the steps indicated above, as taught by Arampatzis-Indexing, for the purpose of supporting an approach consistent with the Phrase Retrieval Hypothesis (§2, ¶1).

Regarding claims 10-12, Julliard in view of Arampatzis-Indexing teach everything claimed, as applied above (see claims 9, 10, and 11, respectively). In addition, Julliard teaches that indexing can be used to (uniquely) access files (or documents) and more accurate information like the position of the sentence in which those words were found (where the organizational construct between documents and sentences is paragraphs) (col. 5, lines 25-44), which corresponds to "locating documents (or paragraphs or sentences) in said natural language text corpus; providing, for each document (or paragraph or sentence) of said natural language text corpus, a unique document (or paragraph or sentence) location identifier identifying the word tokens, phrases, clauses (spanned by the sentence or ), sentences (spanned by the paragraph or) and paragraphs spanned by the document; storing, for each document (or paragraph or sentence), its unique document (or paragraph or sentence) location identifier

Regarding claim 18, Julliard teaches everything claimed, as applied above (see claim 16). But Julliard does not specifically teach "wherein said index comprises multiple indexes based on a hierarchy of text units that are related by inclusion." However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Indexing.

Arampatzis-Indexing teaches linguistically-motivated indexing schemes using multiple indexing sets for different representational choices where a phrase can be recursively represented (i.e., in a hierarchy). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard by specifically providing the indexing and hierarchal representation, as taught by Arampatzis-Indexing, for the purpose of obtaining more detailed representations of both the query and the text.

4. Claims 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julliard in view of Arampatzis et al. ("Linguistically-motivated Information Retrieval"), hereinafter referred to as Arampatzis-Retrieval.

Regarding claim 14, Julliard teaches everything claimed, as applied above (see claim 1), but Julliard does not specifically teach "organizing the extracted information according to degree of correspondence with the query with respect to lexical meaning of word tokens and surface syntactic roles of constituents, such that a constituent in a portion of text having the same lemma as the equivalent constituent of the query is considered to have a higher degree of correspondence than a constituent in a portion of

text being a synonym to the equivalent constituent of the query." However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Retrieval.

Arampatzis-Retrieval teaches techniques for linguistically motivated information retrieval where the similarity between a document and a query can be determined by the function,  $S(d,q)$ , allowing the document collection to be ranked in response to a query (§6) where the processing steps include tokenization, part-of-speech tagging, morphological normalization (lemma determination), lexicosemantical normalization (semantic clustering or expansion) (§7).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard by specifically providing the weighting and matching approach, as taught by Arampatzis-Retrieval, for the purpose of choosing the best match to a query.

Regarding claim 15, Julliard teaches everything claimed, as applied above (see claim 1), but Julliard does not specifically teach "organizing the extracted information such that said portions of text are grouped according to sameness of grammatical subject, grammatical object, and lexical main verb." However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Retrieval.

Arampatzis-Retrieval teaches techniques for linguistically-motivated information retrieval which include weighing and matching the similarity between the document and the query. Julliard's approach includes the unnesting of a phrase frame where the main

head carries the most semantic information of all the other elements in the frame and the frame includes grammatical information such as subject, object and verb (§'s 4-6).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard by specifically providing the features, as taught by Arampatzis-Retrieval, for the purpose of determining a better match between the query and the text.

Regarding claim 17, Julliard teaches everything claimed, as applied above (see claim 1); in addition, Julliard teaches the processing of a user query putting it into tagged form, applying grammar rules and then using mapping or indexing to locate a match within a text corpus (Fig. 2, col. 1, line 45 through col. 2, line 1, col. 5, lines 6-43), which corresponds to "wherein a string of word tokens in said indexed and stored analyzed natural language text corpus matches one of said surface variants." But Julliard does not specifically teach "or said analyzed natural language query if it comprises the head words of phrases bearing the grammatical relations of subject, object, and lexical main verb in said one of said surface variants or said analyzed natural language query in the same linear order as in said one of said surface variants or said analyzed natural language query." However, the examiner contends that this concept was well known in the art, as taught by Arampatzis-Retrieval.

Arampatzis-Retrieval teaches techniques for linguistically-motivated information retrieval including weighing and matching the similarity between the document and the query. Arampatzis-Retrieval's approach includes the unnesting of a phrase frame where the main head carries the most semantic information of all the other elements in the

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frame and the frame includes grammatical information such as subject, object and verb (§'s 4-6).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Julliard by specifically providing the features, as taught by Arampatzis-Retrieval, for the purpose of determining a better match between the query and the text.

#### ***Citation of Pertinent Art***

5. The following prior art made of record but not relied upon is considered pertinent to the applicant's disclosure:

Dragomir et al., ("Ranking suspected answers to natural language questions using predictive annotation," ANLP 2000, May 2000) describes a system to rank answers to natural language questions where both the corpus and query are processed.

#### ***Conclusion***

Any response to this office action should be mailed to:

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Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold, can be reached on (703) 305-4379. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.

VPH/vph  
February 11, 2003

*Marsha D Banks-Harold*  
MARSHA D. BANKS-HAROLD  
SUPERVISORY PATENT EXAMINER  
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